REMARKS

By the present Amendment, claims 1 and 17 have been amended. No claims have been added or cancelled. Accordingly, claims 1-3, 5-9, and 11-20 remain pending in the application. Claims 1 and 17 are independent.

In the Office Action of March 31, 2010, claims 1-3 and 5-20 were rejected under 35 USC §103(a) as being unpatentable over U.S. Patent No. 7,044,913 issued to Shiki et al. ("Shiki") in view of U.S. Patent No. 6,116,244 issued to Hossack et al. ("Hossack"), and further in view of U.S. Patent No. 6,239,796 issued to Alexander et al. ("Alexander"). This rejection is respectfully traversed.

In rejecting the claims, the Office Action maintains that Shiki discloses displaying of color bars based on velocity, but fails to disclose transparency in the color Doppler image and the combination of velocity and variance for bar display. Hossack is relied upon for disclosing transparency [opacity] in the color Doppler image based on variance and a combination of various ultrasound parameters such as velocity and variance in order to emphasize the clinical areas of interest in the display. The Office Action further indicated a recognition of the differences between the prior art and Applicants' invention. The Office Action suggested that the claims be amended to include the subject matter specifying the manner in which the bar selection affects the image processing beyond display of the bar selection, and the manner in which the bar selection results in the display of the imaged data encoded according to the particular selection bar.

By the present Amendment, Applicants have amended the claims to better define the invention by clarifying the manner in which the color Doppler image is changed. As amended, independent claim 1 defines an ultrasound diagnostic apparatus that comprises:

a tomogram forming means for forming a tomogram of a diagnosis portion of an examinee by transmitting/receiving an ultrasound wave to/from the examinee via an ultrasound probe;

color Doppler image forming means for forming a color Doppler image based on a Doppler signal obtained from the diagnosis portion;

a transparency control means for controlling a degree of the transparency of the color Doppler image;

selection means for selecting one or both of a luminance/hue color bar, which is based on the information of a velocity and/or variance of a blood flow, and/or a transparency color bar, which is based on the information of the variance, for alternatively or simultaneously displaying the luminance/hue color bar and/or the transparency color bar on the display means;

image processing means for performing image processing on the tomogram and the color Doppler image; and

display means for displaying images obtained by the image processing means, the tomogram and the color Doppler image being color displayed on the display means,

wherein the image processing means causes the color Doppler image to be displayed transparently, based on the degree of transparency selected by the transparency control means and one or both color bars selected by the selection means, and

wherein the transparency control means selects one of the transparency color bars, changes the relationship between the transparency and the variance, and changes the degree of transparency of the color Doppler image based on the changed relationship.

According to independent claim 1, the ultrasound diagnostic apparatus includes a tomogram forming means for forming a tomogram of a diagnosis portion of an examinee by transmitting/receiving an ultrasound wave to/from the examinee via an ultrasound probe. A color Doppler image forming means is provided for forming a color Doppler image based on a Doppler signal obtained from the diagnosis portion, and a transparency control means is provided for controlling the degree of transparency of the color Doppler image. A selection means is provided for selecting one or both of a luminance/hue color bar, which is based on the

information of a velocity and/or variance of blood flow, and/or a transparency color bar which is based on the information of the variance, for alternately or simultaneously displaying the luminance/hue color bar and/or the transparency color bar on the display means. The apparatus also includes an image processing means for performing image processing on the tomogram in the color Doppler image, and display means for displaying images obtained by the image processing means, the tomogram, and the color Doppler image displayed on the display screen. The image processing means causes the color Doppler image to be displayed transparently based on the degree of transparency selected by the transparency control means and one or both color bars selected by the selection means. Additionally, the transparency control means selects one of the transparency color bars, changes the relationship between the transparency and the variance, and subsequently changes the degree of transparency of the color Doppler image based on the changed relationship.

As discussed in the Specification, the transparency of each point on the three-dimensional voxel is decided based on the variance. See paragraph [0028]. Thus, according to independent claim 1, either or both a luminance/hue color bar and/or transparency color bar can be simultaneously or alternatively displayed with a color Doppler image. The luminance/hue color bar is based on information corresponding to both the velocity and variance of blood flow, while the transparency color bar is based on information corresponding to the variance of blood flow. See also paragraph [0034].

Based on the foregoing, Applicants submit that the newly incorporated features of independent claim 1 sufficiently clarify the claim to define over the cited

references. It is therefore respectfully submitted that independent claim 1 is allowable over the art of record.

Claims 2, 3, 5-8, 10-16, 19, and 20 depend from independent claim 1, and are therefore believed allowable for at least the reasons set forth above with respect to independent claim 1. In addition, these claims each introduce novel elements that independently render them patentable over the art of record.

By the present Amendment, Applicants have amended independent claim 17 to define an ultrasound diagnosing method that comprises, in part, the steps:

> selecting one of the transparency color bars,
>
> changing the relationship between the transparency and the variance, and
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> changing the degree of transparency of the color Doppler image based on the changed relationship.

The ultrasound diagnosis method of independent claim 17 has been amended to recite various additional steps that correspond to those recited in independent claim 1. Specifically, one of the transparency color bars is selected, and the relationship between the transparency and the variance is changed. Finally, the degree of transparency of the color Doppler image is changed based on the changed relationship between the transparency and variance.

As previously discussed, such features are believed to clarify the novel features of the claimed invention. It is therefore respectfully submitted that independent claim 17 is allowable over the art of record.

Claim 18 depends from independent claim 17, and is therefore believed allowable for at least the reasons set forth above with respect to independent claim

17. In addition, this claim introduces novel elements that independently render it patentable over the art of record.

For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 529.45793X00).

Respectfully submitted,
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